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Global Imbalances and the Current Account Adjustment Process An Empirical Analysis

Marius Tippkötter*

Abstract

This paper investigates the impact of the exchange rate regime on the current account adjustment process. In a first step, the present analysis assesses previous empirical work supporting the predominant view that more flexible exchange rate regimes facilitate current account adjustments. Using a FGLS estimator with fixed effects and panel corrected standard errors, the author draws upon the methodological approaches of two pertinent papers. The data set encompasses data for 171 countries for the 1970 to 2008 period. According to the fixed effects estimations, evidence in favor of the "conventional wisdom" does not prove to be robust. After pointing out fundamental weaknesses of the fixed effects estimator within this context, the author performs a dynamic panel estimation using a System GMM estimator fully developed in Blundell and Bond (1998). The results of this approach stand in contrast to the previous estimations, providing solid empirical evidence in favor of the predominant view. A monotonic relationship between exchange rate regime flexibility and the rate of current account reversion can be observed, indicating faster current account convergence for more flexible regimes. By employing an estimator that is more germane to the issue under investigation, the paper fills an important gap between economic common sense and its underlying empirics.

Keywords: Current Account Adjustment Process, Current Account Imbalances, Exchange Rate Regime Flexibility

JEL-classification: F31, F32

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Introduction

This paper investigates the impact of the exchange rate regime on the current account adjustment process. It contributes to a debate that has experienced particular great attention throughout the past years, namely the issue of global imbalances.[1] An overwhelmingly large U.S. balance of payments deficit and concomitant seemingly ever-increasing Asian surpluses in the years preceding the 2007-2010 crisis are the main characteristics of a situation that has been considered to be of great importance for the world economy and its stability in particular. What is more, in the wake of economic hardship facing Portugal, Italy, Greece, and Spain (unamiably known as the PIGS), European imbalances have become an intensely disputed issue. Macroeconomists have not yet formed a consensus on whether the continued existence of global imbalances is driving the world economy towards another global crisis. The discussion about how to evaluate the impacts of today's current account surpluses and deficits, which have changed only in magnitudes, but remained fundamentally unchanged with respect to their composition since the outbreak of the crisis, has still not come to an end.[2]

One of the more basic points in the discussion focuses on the relationship between the exchange rate regime and the balance of payments of a country. Whereas the theoretical literature on potential equilibria of global imbalances itself is fairly extensive,[3] the empirical research on the impact of the exchange rate regime on the return of the current account to its long-term equilibrium has been comparably little until recently. Moreover, what might be the most puzzling feature is the fact that the basic findings of the existing literature have been fundamentally contradictory and therefore, largely inconclusive for the most part. In a situation where a remarkable frequency of calls for a more flexible Chinese exchange rate regime can be observed, because this would lead to an abatement of global imbalances, this state of indecisiveness raises reason for concern. The predominant view that exchange rate flexibility facilitates current account adjustments is not nearly as much buttressed by empirical research as one might assume. Looking at these popularly promulgated policy

[1] In the literature, there is no clear-cut definition of the term of an external balance (see for instance: Krugman and Obstfeld 2009, p. 504). The present paper adopts the explication laid out in Bracke et al (2008) characterizing global imbalances to be "external positions of systematically important economies that reflect distortions or entail risks for the global economy."

[2] See for instance: Aisen and Eterovic (2010), Baldwin (2009), Baldwin and Taglioni (2009), Blanchard and Milesi-Feretti (2009), Obstfeld and Rogoff (2009), and Wolf (2010). Bibow (2006) represents an early work addressing issues in the European Union.

[3] Examples are Batini et al. (2009), Faruqee et al. (2006), Gust et al. (2008), and Meredith (2007).

statements, the present paper mitigates this deficiency by providing new systematic evidence in favor of this position while drawing upon previous work that is pertinent to the question.

The paper contributes to the discussion in three important ways. First, it provides a comprehensive juxtaposition of the empirical research that has been carried out so far. Secondly, the present study makes two antagonistic papers by Chinn and Wei (2009) on the one hand, and by Herrmann (2009) on the other hand, more comparable. By adopting a methodology that is orientated at Herrmann's work while applying it to a substantially larger data set that is similar to the one originally scrutinized by Chinn and Wei, it enables a better assessment of the issue under consideration. Since the data set comprises data for 171 countries for the 1970 to 2008 period, previous results can be tested on a large scale.[4] Thirdly, the paper argues for an alternative approach that seems to be more germane to the estimated relationship. Here, the inherent weaknesses of the fixed effects estimator to deal with the endogeneity issue motivates the author to adopt a System generalized method of moments (GMM) estimator developed by Blundell and Bond (1998). The results of both estimations are presented in order to draw conclusions for the ongoing debate on global imbalances. It is important to note, however, that this paper is confined to discuss the impact of the exchange rate regime on the accumulation of current account surpluses and deficits that could eventually lead to global imbalances which pose systemic risks to the world economy. If any, the reader will find only indicative points on the assessment of global imbalances as a reason for concern or as a natural outcome of global economic and financial integration.

The remainder of the paper is organized as follows. Chapter 2 demonstrates the underlying motivation for this paper and reviews the existing literature. A sufficiently detailed summary of the two contrary views, as well as a short account of their methodological differences is presented. Chapter 3 lays out the data and demonstrates the construction of the exchange rate regime variable. While chapter 4 introduces the econometric model of interest, the empirical results are displayed in the fifth part of the paper. After the results are laid out and discussed, Chapter 6 concludes.

[4] Whereas Chinn and Wei's (2009) data encompasses over 170 countries for the 1971 to 2005 period, Herrmann's (2009) data set contains only information for 11 catching-up countries from central, eastern and south-eastern Europe between 1994 and 2007.

1. Motivation

1.1. A Brief Look at History

In a global world, there is no reason for current accounts to be balanced. Deficits as well as surpluses are neither intrinsically good nor bad. Not allowing for departure from current account equilibrium would inhibit countries to gain from inter-temporal trade and prevent that the world's capital concentrates in those areas with the most profitable investments. Therefore, it is in the common interest of countries to permit a certain degree of imbalances in the world economy. Indeed, it is desirable for saving to go where it is most productive, and large external positions can therefore emerge naturally from differences in saving behavior, in the rate of return on capital, or in the degree of risk or liquidity of different assets. Imbalances are not prima facie bad, since they may reflect the optimal allocation of capital across time and space.

Notwithstanding, as laid out by Blanchard and Milesi-Feretti (2009), there are imbalances that are not fully justified by these kinds of structural factors, but are rather the symptoms of underlying distortions. In cases where they represent deviations from equilibrium, it is desirable to find ways of reducing global imbalances in order to prevent tensions in the world economy or even financial crises. At this point, the view that exchange rate flexibility facilitates current account adjustments has been predominant. If we have a look at history, it is very easy to find examples, where the pegging of the exchange rate seems to have been conducive to the accumulation of substantial current account surpluses and deficits, some of which represented apparent deviations from the equilibrium.

To name only three pertinent examples, the phase from 1870 to 1914 is very likely to have been the earliest instance where external assets and liabilities piled up very fast under the inflexible exchange rate regimes of the gold standard, thereby giving way to persisting current account imbalances (Meissner and Taylor 2006, p. 22). At the peak level, current account surpluses in Britain amounted to 9% of GDP with similar figures for France, Germany and the Netherlands. As a share of GDP, these magnitudes are unmatched until the present day.[5] A second example represents the attempt to restore the gold standard after World War I. Most of the countries returned to gold convertibility at misaligned exchange rates. Britain's exchange rate proved to be overvalued while other countries such as France and Germany pegged their

[5] See Bordo (2005) for details.

rate at an undervalued level. During the years that followed, Britain ran chronic balance of payments deficits, whereas France and Germany's surpluses were considered to be the corollary of their reluctance to let their price levels rise. Thirdly, and probably the most interesting example, is the case of Japan during the era of the Bretton Woods system. This instance is particularly instructive, because it appears to share important similarities with the Chinese situation in today's world economy. Japan, being committed to a strategy of export-led growth, deliberately adopted an exchange rate at an undervalued level.[6] Because of its increased international competitiveness on the traded goods market, a substantial current account surplus accrued. Japan's strategy seemed to be a good way of ongoing economic growth since its growth rates ranked extraordinarily high during that time. However, the chronic current account surplus eventually caused tensions with foreigners and enforced inflationary pressures through capital inflows. This made the upholding of the peg at the given rate increasingly difficult. Japanese authorities were reluctant to give in to the growing pressure for a revaluation because they feared to mess with a strategy that had served them well. Not before the gold window was closed, thereby marking the collapse of Bretton Woods order, the yen was allowed to appreciate.

Two implications of the examples are: first, that the largest imbalances ever measured took place under a system of fixed exchange rates, and second, that the strategy of pegging its exchange rate to boost trade – thereby widening the trade balance – has been a popular strategy for decades. Both facts provide reason to believe in the validity of the "conventional wisdom". Instances where inflexible exchange rates go hand in hand with the accumulation of large deficits and surpluses have not been infrequent in earlier periods and support the predominant view that fixed exchange rates are conducive to the build-up of imbalances. Obviously, these historical considerations are suggestive, but unsatisfactory. They do not offer any proof for a systematic causality we are interested in. Henceforth, it is the ambition of the present paper to provide robust evidence for the validity of the "conventional wisdom".

[6] By export-led growth the author means a policy strategy that relies on an undervalued exchange rate coupled with measures to compress domestic demand, thus preventing "overheating" and real appreciation through inflation.

1.2. Literature Review

Opinions on the feasibility of today's imbalances are numerous: reaching from the accentuation of the risk for "sustained deviations from equilibrium" (Bracke et al. 2008, p. 11), over the view of the situation as an informal "Bretton Woods II" agreement where the current pattern would be optimal for all participants (e.g. Dooley et al. 2003), to the point of a complete negation of imbalances "once capital flows are endogenized as risk-adjusted returns and diversification opportunities" (Xafa 2007, p. 795), only the great importance of the phenomenon seems to be unanimous. Considering the extent of the literature on global imbalances together with the far-reaching consequences they might entail for the world economy, it is particularly surprising that the empirical literature on the impact of the exchange rate regime falls so significantly behind theoretical analyses of the phenomenon.

According to economic theory, catch-up economies tend to experience a real exchange-rate appreciation in the long run. Since productivity is growing relatively fast, currency appreciation is needed to prevent disequilibrium between the growth of exports and imports through a higher command of consumers over traded goods. When a country pegs its exchange rate, this mechanism is suppressed. As a result, market pressures bottle up. This reasoning leads to the conclusion that inflexible exchange rates tend to promote the accumulation of imbalances that may entail deviations from market equilibrium.[7] The first ones to study this relationship empirically have been Chinn and Wei (2009), who drew the conclusion that there would *not* be a significant difference in the current account adjustment process with regard to the flexibility of the exchange rate regime, thereby contrasting the predominant view that greater flexibility would be conducive to these adjustments. Using variations of a basic autoregression, they estimate the rate at which current account balances revert to their mean values. The two authors scrutinize a data set encompassing data for over 170 countries over the 1971 – 2005 period. For our discussion, it is important to note that they employ two de facto exchange rate regime indices that are codified as discrete variables. Due to the absence of persuasive empirical evidence for the position that exchange rate flexibility really facilitates current account adjustment, they claim that "the policy recommendation for a more flexible exchange rate regime in pursuit of current account adjustment is a faith-based initiative – based on something widely assumed to be true, actively peddled to the countries as a truth, but with little solid empirical support" (2009, p. 1). In total, they do not find any

[7]See for instance: Eichengreen (2008), p. 215

strong or robust evidence of a monotonic relationship between the exchange rate regime and the speed of current account adjustments.

Following, Herrmann (2009) finds the contrary, i.e. that flexible exchange rate regimes do indeed exhibit less current account persistence than others. Even though Herrmann explicitly refers to the work of Chinn and Wei, the two papers are hard to compare since they consider data sets which differ greatly in size and scope while adopting different model specifications. Herrmann uses data for eleven European countries between 1994 and 2007 only. Another decisive difference is the way of how the exchange rate regime is determined. While Chinn and Wei (2009, p. 13) conclude that their findings would be "independent of which de facto exchange rate regime classification scheme" they use, Herrmann (2009, p. 17) points out that "the way the exchange rate regime is measured has an important bearing on the outcome." These contrary evaluations might be due to the different ways of classifying the exchange rate regime. Chinn and Wei rely on two different de facto exchange rate categorizations expressed by dummies, whereas Herrmann utilizes a continuous variable that measures the volatility of the nominal exchange rate as a proxy for different regimes. This paper aims to shed light on whether findings are caused by the different ways of classifying the exchange rate regime or if the country samples matter.

2. Data

In this paper, the author uses data for 171 countries for the 1970 to 2008 period. Data on the current account, trade, and inflation rates are obtained from the World Bank's "World Development Indicators (2008)". Moreover, the present study employs the Chinn/Ito index "KAOPEN" of financial liberalization (Chinn and Ito 2008) as variable specifying financial openness. The exchange rate variable is constructed from the IMF's International Financial Statistics as demonstrated in the next paragraph.[8]

Chinn and Wei employ two popular de facto classifications. Basically, their analysis relies on a categorization developed by Levy-Yeyati and Sturzenegger (2003a) and codifies it as a polychotomously ordered variable (ranging from 0 – 3; original index: 1 – 5). They check their results by operating the same regressions with an aggregated version of the Reinhart and

[8] A comprehensive overview of the variables and the data sources can be found in Annex A.

Rogoff (2004) measure (ranging from 1 – 3; original index: 1 – 14). For the question under consideration, using discrete variables might be a too crude distinction. Pointing in the same direction, Herrmann indicates in her work that the original Reinhart and Rogoff index with a range from 1 to 14 "seems to be more adequate than the RR 3 which is used by Chinn and Wei to measure the exchange rate regime" (2009, p. 14). The present empirical analysis adopts the same measure that is also being used by Herrmann. The *z-score* measure proposed by Ghosh et al. (2003) expresses the behavior of the exchange rate regime by computing a volatility variable of the following sort:

$$z_{it} = \sqrt{\mu_{it}^2 + \sigma_{it}^2} \qquad (1)$$

where μ_{it} is the arithmetic mean of the average monthly percent changes of the nominal effective exchange rate of country i in year t, and σ_{it} is the standard deviation of the monthly percent changes of the nominal effective exchange rate for country i in year t. The volatility measure of equation (1) represents our exchange rate regime variable throughout the course of our study.[9]

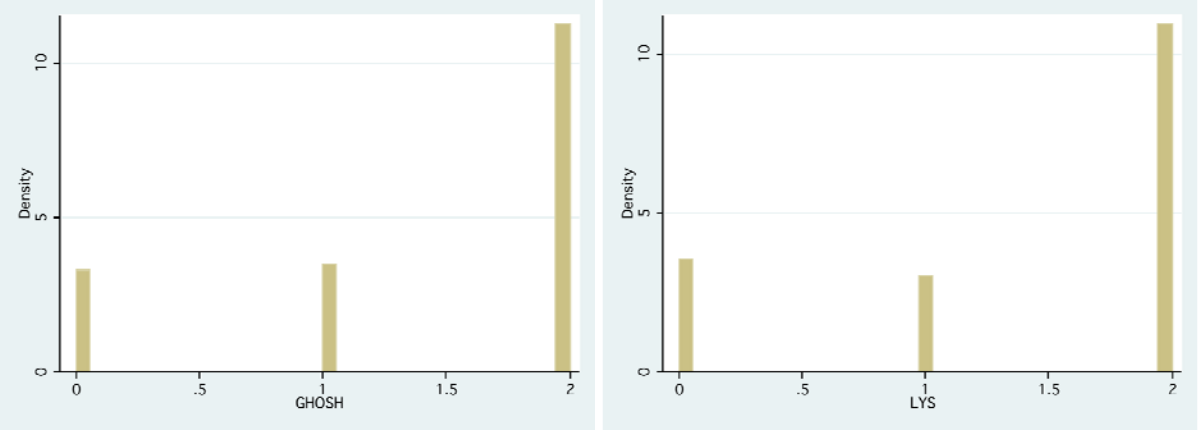
The author uses data on the nominal effective exchange rate from the IMF's Information Notification System of the "International Financial Statistics" database and computes the necessary components for 171 countries for the 1970 to 2008 period.[10] At the outset, we expect higher volatility degrees for more flexible regimes. In order to proof this assumption and to demonstrate that this measure does not stand in contrast to other classifications, the following part of the paper scrutinizes the exchange rate volatility according to the regime for the Levy-Yeyati and Sturzenegger (LYS) de facto classification used by Chinn and Wei, and a de jure measure provided in Ghosh et al. (2003). De jure classifications emphasize the importance of public pronouncements as signal for the private's sectors expectations. Unlike de facto classifications, they have the strength of conveying

[9] One might claim that account balances are determined by real factors, most notably the *real* exchange rate instead of the nominal one. Note that, as we are concerned with *adjustment* dynamics, the real exchange rate – taking into consideration multiple price rigidities – in the short run may depend predominantly on nominal exchange rate movements. As a result, the exchange rate regime could indeed affect current account adjustment.

[10] In order to double-check the data, the author compares his results with the ones by Ghosh et al. (2003) who make the z-score measure and its components available for 167 countries from 1970 to 1999. Herrmann's z-score data is only displayed in diagrams what makes it hard to replicate the results, due to the relatively inexact information.

information on future policy intentions, thereby capturing signaling functions of announced regime choices – something which lies at the core of much modern thinking about the effect of regimes.[11] De facto classifications have a backward-looking nature. They, in turn, perform much better in detecting the sizable numbers of the so-called "soft pegs" and "hard floats". While the former term relates to cases where the central bank does not take its commitment to defend the parity very seriously, the latter refers to cases where the exchange rate is officially floating, but the central bank nevertheless intervenes heavily in the foreign exchange rate markets. Because of these structural differences, it is instructive to check one measure for each of the two different types of classification. In a first step, figure 1 shows the density histograms for both measures. In order to compare them more easily, they are both shown with the same range (where "0" denotes floating, "1" intermediate, and "2" fixed regimes).

Figure 1: Density Distributions of the De Jure (Ghosh) and De Facto Measure (LYS)



Source: Ghosh et al. (2003) and Levy-Yeyati Sturzenegger (2003a)

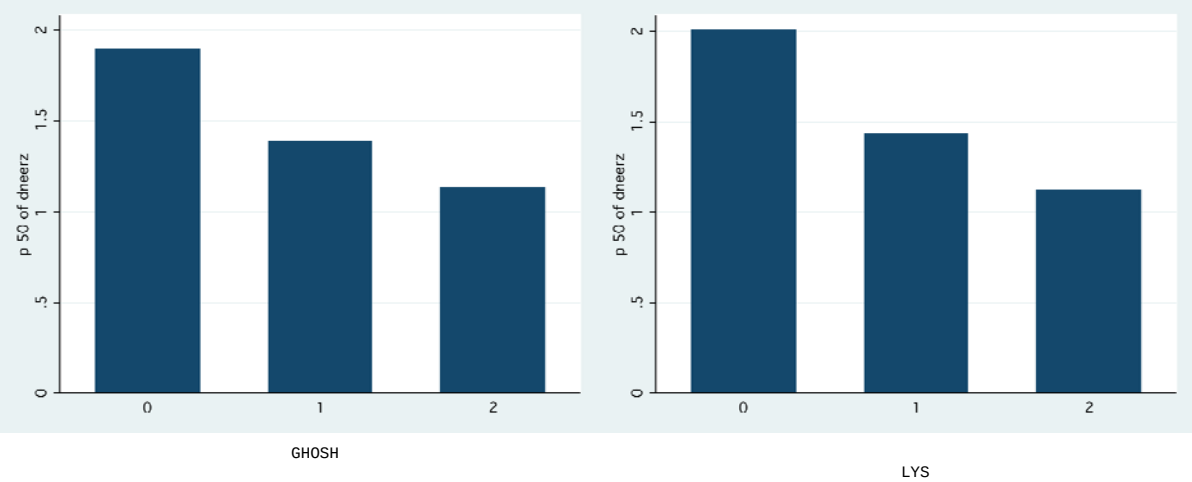
The basic distribution is replicated for both the de jure and the de facto classification. While the fixed category is by far the largest of the three, including about 2500 observations, the other two categories contain similar numbers of observations, showing only a small difference between the two classifications. Moving on, figure 2 shows the median z-scores of the different regimes for both measures. For both classifications the median z-score increases with greater exchange rate flexibility, i.e. for a greater number of observations the nominal effective exchange rate volatility is higher for more flexible regimes.[12] As a consequence, the

[11] Cf. Ghosh et al. (2003), p. 42

[12] The same pattern holds true for the LYS measure with a range from 0 to 3 as can be seen in figure 3 in Annex B. The means do not show strictly increasing values according to regime fixity for the LYS classification as can bee seen in figure 4 in the Annex. If we consider the box plots, however, we see that its mean is biased by

assumption that the values of our regime variable increases when moving from fixed to floating is justified. So even if one employs the continuous exchange rate variable instead of the more commonly used discrete classifications, one should not come to fundamentally different conclusions because of this difference. It is rather the case that one is able to measure the relationship more accurately due to the finer distinction.

Figure 2: Median z-scores According to Regime



3. Model Specifications

3.1. Basic Model

In order to address the question of how robust previous empirical results have been and to what extent they can be explained either by the selection of the sample size or their methodological approach, the paper first considers a model that stands in line with the one employed by Chinn and Wei (2009). It estimates the rate at which current account balances revert to their mean values, but uses the continuous exchange rate volatility measure instead of dummy variables. The data set encompasses data for 171 countries for the 1970 to 2008 period. The panel is unbalanced, with some countries having more observations than others. The approach is based on estimating the following equation:

$$CA_{it} = \rho_0 + \rho_1 CA_{it-1} + \beta_1 Regime_{it} + \beta_2 CA_{it-1} * Regime_{it} + \varepsilon_{it} \qquad (2)$$

few influential points in the intermediate category. Again, this finding is independent of which range is taken for LYS.

where CA is the current account as percent of GDP, ρ_1 the autoregressive coefficient[13], *Regime* is the exchange rate volatility measure and ε_{it} the error term. The country is indicated by the subscript i (see the Annex for a list of countries) and the year by subscript t.

In general, this approach assumes that there exists a country-specific long-run equilibrium for the current account and it is equivalent to its mean value. The adjustment process, therefore, consists in the return of the current account from any default value to its mean. However, the present model does not impose the requirement that the mean of the current account as percent of GDP must be equal to zero. As a consequence of this specification, it allows current account positions that are due to cross-country differences in saving patterns, investment patterns, and portfolio choices, thereby representing natural reflections of differences in levels of development or demographic patterns rather than imbalances that are caused by domestic and/or international distortions.

The basic model focuses exclusively on the impact of the exchange rate regime on the reversion of the current account balance. Thus, the coefficient of interest is β_2, since it measures the difference in the adjustment process with regard to the degree of exchange rate flexibility. The present paper tests the null hypothesis that a more flexible exchange rate regime facilitates current account adjustment. If the "conventional wisdom" proves to be true, this would have to be displayed by a negative coefficient for β_2, as exchange rate volatility increases with the degree of exchange rate regime flexibility and current account persistence should decrease with increasing volatility. As we are not concerned with the level of the current account, the exchange rate regime variable itself is not meaningful and should not be interpreted. Reasons for its inclusion are primarily technical.

3.2. Augmented Model

For robustness checks, equation (2) is augmented by including supplementary control variables throughout the course of our study. When we allow for these additional potential determinants of the rate of current account reversion, the model takes the form as follows:

$$CA_{it} = \rho_0 + \rho_1 CA_{it-1} + \beta_1 Regime_{it} + \beta_2 CA_{it-1} * Regime_{it} + \beta_3 Trade_{it} + \beta_4 Finance_{it} + \beta_5 Inflation_{it} + \quad (3)$$

[13] An autoregressive term of order one is sufficient for the annual data used in this work as shown by Chinn and Wei (2009, p. 3).

$$\beta_6 CA_{it-1} * Trade_{it} + \beta_7 CA_{it-1} * Finance_{it} + \beta_8 CA_{it-1} * Inflation_{it} + \varepsilon_{it}$$

where *Trade* is the sum of exports and imports as percent of GDP, *Finance* a measure of financial openness and *Inflation* the inflation rate as measured by annual consumer prices.

A reasonable expectation for the trade variable is that the coefficient has a negative sign. The intuition behind this assumption is that greater trade openness might lead to faster reactions of the trade balance to real exchange rate changes, thereby causing a faster return of the current account to its equilibrium. On the contrary, one might hypothesize that financial openness makes a country more prone to financial shocks, which would result in more frequent current account deviations from its stable level. Thirdly, we would want to check whether the inflation rate has an impact on our results, since pegging the exchange rate as a nominal anchor to reduce inflation rates remains popular.[14]

3.3. Lagging endogenous variables

Following Herrmann, the present paper deals with the issue of endogeneity in the model by lagging all variables that involve our exchange rate measure.[15] Next to the different exchange rate regime variable, this represents another methodological divergence of the two papers. The rationale for this step is that one cannot preclude the possibility that causality works in both directions. The exchange rate volatility is likely to be also a function of the current account and, thus, not strictly exogenous. This is especially the case if a volatility variable is employed for the assessment of the exchange rate regime. In times of rapid current account adjustment, higher exchange rate volatility may be observed. When this modification is incorporated, we obtain the following equation for the basic model:

$$CA_{it} = \rho_0 + \rho_1 CA_{it-1} + \beta_1 Regime_{it-1} + \beta_2 CA_{it-1} * Regime_{it-1} + \varepsilon_{it} \qquad (4)$$

For the augmented model, the paper follows Herrmann and lags additionally the variables for trade and financial openness, since a certain degree of endogeneity might be present in these variables, as well:

[14] See for instance Keller and Richardson (2003), Mishkin (2007a), p. 227 ff., and Mishkin (2007b), p. 11f.

[15] Chinn and Wei also address the issue of endogeneity in their work. In contrast to the way this part of the paper takes care of the issue, they examine whether their conclusions are robust to endogeneity concerns using a two-step procedure. In a first step, they estimate a probit model for each indicator variable (i.e. for every regime of the LYS measure). Afterwards, they use the predicted regime variables instead of the actual ones for their estimations. They report no differences between this estimation method and the one adopted in equations (2) and (3) of the present study (see Chinn and Wei 2009, p. 10f.).

$$CA_{it} = \rho_0 + \rho_1 CA_{it-1} + \beta_1 Regime_{it-1} + \beta_2 CA_{it-1} * Regime_{it-1} + \quad (5)$$

$$\beta_3 Trade_{it-1} + \beta_4 Finance_{it-1} + \beta_5 Inflation_{it} +$$

$$\beta_6 CA_{it-1} * Trade_{it-1} + \beta_7 CA_{it-1} * Finance_{it-1} + \beta_8 CA_{it-1} * Inflation_{it} + \varepsilon_{it}$$

In the following section, the paper starts discussing the empirics that are helpful in answering the question of whether there is a difference for the current account adjustment process with regard to the exchange rate regime.

4. Empirical Results

4.1. Preliminary Considerations

A first indicative step is to look at the random effects autoregressions when the sample is stratified according to the already established classifications from above, i.e. the de facto LYS measure and the de jure measure by Ghosh. Table 1 reports the results for the degree of current account persistency according to the regime. Robust standard errors are displayed in brackets.

Table 1: Current Account Persistence According to the Ghosh and LYS Classification – Random Effects Panel Estimation

	Ghosh (de jure)			LYS (de facto)		
	Float	Interm.	Fixed	Float	Interm.	Fixed
CA(-1)	.614 (.044)***	.715 (.025)***	.756 (.024)***	.691 (.032)***	.738 (.027)***	.810 (.021)***
Obs.	466	686	1479	724	502	1578
R^2	.68	.64	.56	.58	.68	.64

Notes: Dependent Variable: Current Account as % of GDP, *significant at 10%, **significant at 5%, ***significant at 1%

Persistence increases with regime fixity for both classifications.[16] But even if this result is suggestive, the basic autoregressions in table 1 are obviously too crude to serve as an adequate way of estimating whether the exchange rate has an impact on the current account adjustment process. Next, the author re-runs the estimation for the whole data set and include the continuous regime variable (table 2). We observe a non-significant coefficient for the

[16] The results are not overturned when the LYS classification with a range from 0 to 3 is considered.

interaction term. All the results shown in tables 1 and 2 are similar to the ones Chinn and Wei report for the LYS classification. The coefficient we obtain for the lagged current account amounts to 0.736 and compares to the 0.747 they found in their study (2009, table 1 p. 15). Also, when the continuous regime variable and the interaction term are included, we end up with similar results for the lagged current account (0.708 to 0.680). More importantly, one does not find evidence for a difference in the rate of reversion according to higher degrees of flexibility even if measured by the z-score variable instead of the polychotomously ordered LYS variable.[17]

Table 2: Current Account Persistence According to the Volatility Measure – Random Effects Panel Estimation

	Current Account Persistence	
CA(-1)	.736 (.019)***	.708 (.017)***
REGIME		.062 (.033)*
CA(-1)*REGIME		-.004 (.006)
Obs.	3640	3000
R^2	.64	.64

Notes: Dependent Variable: Current Account as % of GDP

An immediate problem with these regressions is that CA_{it-1} is correlated with the fixed effects in the error term, which gives rise to the "dynamic panel bias" (Nickel 1981). It inflates the coefficient for the lagged current account by attributing predictive power to it that actually belongs to the country's fixed effect. Consider a country experiences a large negative current account shock for some reason not modeled in a year between 1970 and 2008, so that the shock appears in the error term. Ceteris paribus, the fixed effect of that country for the entire period, which is the deviation of its average unexplained current account from the sample average, will appear to be lower. In the following year, the lagged current account and the fixed effect will both be lower. Even though the impact of one year's shock on the country's fixed effect is mitigated by increasing *T*, this does not resolve the endogeneity problem.[18]

[17] Estimating the relationship using dummies according to the LYS classification yields similar results.
[18] See section 5.3.1 for details.

There are two ways to work around the endogeneity involved in our model. The first is to transform the data so as to remove the fixed effects. This corresponds to the basic approach used by Chinn and Wei (2009) as well as Herrmann (2009). In the following section, the author is going to focus on this way of estimating the relationship, since we first want to undertake a robustness check for the results that were laid out in previous work. The second possibility to take care of the endogeneity problem is to instrument CA_{it-1} and any other variable that might not be strictly endogenous with variables thought to be uncorrelated with the fixed effects.[19] The present analysis is going to discuss this second approach in more detail after having reviewed the results for the fixed effects estimations in chapter 5. Subsequently, the author employs a dynamic panel estimator following Blundell and Bond (1998).

4.2. Fixed Effects Estimation

4.2.1. Does the Regime Variable Matter?

At this stage, a model that is more appropriate than the naïve autoregressions of section 4.1 is estimated. The study continues by estimating the panel model using a FGLS estimator using fixed effects and panel corrected standard errors. This approach is comparable to the one proposed by Chinn and Wei, but uses the continuous volatility measure instead of discrete regime dummies. As a consequence of this estimation method, it is possible to test whether the outcome is overturned by the use of the alternative regime variable. Does the simple use of the z-score variable already produce different empirics than the polychotomous exchange rate regime variable or not?

The first column of table 3 reports the results for the basic model (2) and the second column the ones for the augmented model (3). Results for both models including time effects are shown in column three and four. Time dummies are taken into account for two reasons. First, they serve as an additional robustness check. Second, results are displayed so as to ensure comparability to the alternative methodological approach laid out in section 5.4, where the inclusion of time dummies is crucial. The main conclusions are as follows. We do not find any evidence for faster adjustments of the current account for higher degrees of exchange rate

[19] Even though Herrmann includes a robustness check incorporating an instrumental variable (IV) estimator according to Anderson and Hsiao (1982), she focuses mainly on the fixed effects estimator in her analysis. More importantly, this type of dynamic panel estimator has drawbacks when compared to others. This is laid out in section 5.4.2 of the present paper.

flexibility. The interaction term between the lagged current account and the exchange rate volatility exhibits inconsistent signs and is never statistically significant. As a result, the implied rate of reversion – which is around 0.32 for the basic model as measured by the autoregressive parameter ρ_1 – does not depend on exchange rate fixity. This finding stands in contrast to Herrmann who found the opposite for her sample of 11 countries comprising 143 observations. Overall, the additional control variables are in accord with our expectations and similar to the ones reported by Chinn and Wei.

Table 3: Current Account Adjustment – FGLS

	Basic Model	Augmented Model	Basic Model With Time Effects	Augmented Model With Time Effects
CA(-1)	.677	.540	.641	.532
	(.020)***	(.042)***	(.021)***	(.045)***
REGIME	.077	.061	.099	.054
	(.037)**	(.047)	(.040)**	(.048)
CA(-1)*REGIME	-.003	.002	.004	.001
	(.007)	(.009)	(.007)	(.009)
Trade		-.012		-.019
		(.006)**		(.007)***
Finance		.222		.142
		(.081)**		(.099)
Inflation		.007		.008
		(.004)*		(.004)*
CA(-1)*Trade		.001		.001
		(.000)***		(.000)***
CA(-1)*Finance		.027		.027
		(.011)**		(.011)**
CA(-1)*Inflation		.001		.001
		(.001)		(.001)
Obs.	3000	2608	2707	2422
R^2	.64	.62	.66	.63

Notes: Dependent Variable: Current Account as % of GDP

In order to allow for heterogeneity in the sample, the panel is stratified into several subcategories. The paper uses a classification of countries into industrial countries, non-industrial countries and non-industrial, non-oil exporting countries based on the IMF's World Economic Outlook (WEO). As a means to double-check all of the following results for the smaller samples, results for the World Bank's classification (WDI) of countries into high, medium, and low-income countries are reported in Annex A, as well. While table 4a reports the models without considering time dummies, 4b takes these effects into account. It seems to be important to allow for different rates of reversion. In the basic model, the autoregressive coefficient declines from around 0.78 for the industrial country group to about 0.65 for the non-industrial countries category. The same pattern is replicated for the augmented model.

Excluding oil exporters from the non-industrial group does not change the outcome. A similar interpretation applies to the estimations based on the World Bank's classification: coefficients

Table 4a: Current Account Adjustment – FGLS, by Country Groups (WEO)

	Industrial		Non-Industrial		Non-Industrial, Non-Oil Exporter	
	Basic Model	Augmented Model	Basic Model	Augmented Model	Basic Model	Augmented Model
CA(-1)	.783	.691	.651	.471	.653	.430
	(.033)***	(.078)***	(.024)***	(.054)***	(.025)***	(.058)
REGIME(-1)	.099	.040	.083	.071	.078	.055
	(.074)	(.100)	(.041)**	(.052)	(.044)*	(.054)
CA(-1)*REGIME	-.008	-.025	-.000	.005	-.002	-.000
	(.011)	(.021)	(.007)	(.009)	(.008)	(.010)
Trade		-.012		-.012		-.013
		(.009)		(.007)*		(.007)*
Finance		.084		.185		.191
		(.113)		(.128)		(.132)
Inflation		-.020		.008		.010
		(.019)		(.005)		(.004)**
CA(-1)*Trade		.001		.002		.002
		(.001)		(.000)***		(.000)***
CA(-1)*Finance		.075		.001		-.013
		(.019)***		(.015)		(.018)
CA(-1)*Inflation		-.001		.001		.001
		(.002)		(.001)		(.001)
Obs.	845	755	2155	1853	2019	1722
R^2	.77	.75	.59	.57	.60	.58

Notes: Dependent Variable: Current Account as % of GDP

Table 4b: Current Account Adjustment – FGLS (with time effects), by Country Groups (WEO)

	Industrial		Non-Industrial		Non-Industrial, Non-Oil Exporter	
Time Effects	Basic Model	Augmented Model	Basic Model	Augmented Model	Basic Model	Augmented Model
CA(-1)	.767	.675	.614	.474	.607	.415
	(.035)***	(.077)***	(.025)***	(.059)***	(.027)***	(.063)***
REGIME(-1)	.110	.008	.103	.063	.097	.042
	(.076)	(.104)	(.045)**	(.053)	(.048)**	(.055)
CA(-1)*REGIME	-.002	-.022	.005	.004	.004	-.000
	(.011)	(.024)	(.008)	(.010)	(.009)	(.010)
Trade		-.005		-.023		-.023
		(.012)		(.008)***		(.008)***
Finance		.093		.123		.105
		(.122)		(.142)		(.143)
Inflation		-.025		.008		.009
		(.021)		(.004)*		(.005)**
CA(-1)*Trade		.001		.001		.002
		(.001)		(.000)***		(.001)***
CA(-1)*Finance		.086		.002		-.015
		(.021)***		(.017)		(.019)
CA(-1)*Inflation		-.001		.001		.001
		(.002)		(.001)		(.001)
Obs.	777	702	1930	1720	1807	1601
R^2	.79	.79	.61	.58	.62	.58

Notes: Dependent Variable: Current Account as % of GDP

for the lagged current account are greater for countries with higher income (table 5, p. 41). It also appears to be instructive to stratify the sample into smaller subcategories with regard to

other variables than the autoregressive parameter. On the one hand, the results for the regime, trade, and inflation variables in the full sample seem to be driven by the non-industrial country group (WEO), and the medium to low income groups respectively (WDI). On the other hand, the coefficient for the finance interaction term appears to be dominated either by the industrial country group or the high-income countries, depending on the classification that is concerned. All results are independent of the inclusion of time dummies.

The most important finding is, however, that the main conclusion of the present study remains unchanged for all subcategories. Again, we do not find any evidence for an increased speed in current account reversion for higher degrees of exchange rate flexibility. The coefficient for the interaction term between the lagged current account and the exchange rate volatility turns out to be continuously insignificant. A single exception poses the high-income group in table 5b (p. 41). Since this is only an isolated case for the augmented model with the inclusion of time dummies and the coefficient is only significant at the ten percent level, it does not alter the absence of any robust evidence in support of the "conventional wisdom". Furthermore, signs for β_2 are alternating across, and sometimes even within country groups.

In short, we find no evidence for an impact of the exchange rate volatility on the current account adjustment process. That is, also if we measure the exchange rate regime based on the volatility variable, a more flexible exchange rate does not imply faster current account convergence. So far, the reported results confirm Chinn and Wei's finding and suggest an absence of the effects as observed in Herrmann's work for the larger data set.

4.2.2. Robustness of the "Conventional Wisdom"

In the next step, we now want to check previous results by moving to the estimation based on equations (4) and (5). This can be seen as the most direct robustness test in our study of Herrmann's conclusion in support of the predominant view, because it adopts essentially the same model specifications. At this stage, not only the alternative way of measuring the exchange rate regime is employed. As a reminder, the fundamental difference to previous estimations consists in lagging additionally all variables that might be endogenous. The regressors concerned are those involving the regime variable, as well as the trade and financial openness variables.

Table 6 replicates the results for the full sample that we saw before. Again, column one displays refers to the basic model and column two to the augmented model including other potential determinants of the current account adjustment. Column three and four show the results when time dummies are introduced into the equations. In total, the modification of the model on basis of endogeneity concerns does not yield contrary evidence to what we have seen before. The findings presented by Herrmann in support of the "conventional wisdom" does not hold true for the present study. Neither in the full sample, nor in the subsamples do the coefficients indicate faster current account convergence with increasing flexibility. The latter is verified in tables 7 (p. 23) and 8 (p. 42, Annex A).

Table 6: Current Account Adjustment – FGLS (with lags)

	Basic Model	Augmented Model	Basic Model With Time Effects	Augmented Model With Time Effects
CA(-1)	.674	.670	.633	.642
	(.024)***	(.029)***	(.026)***	(.029)***
REGIME(-1)	.107	.121	.137	.134
	(.045)**	(.060)**	(.055)**	(.063)**
CA(-1)*REGIME(-1)	-.008	-.002	-.010	-.004
	(.009)	(.012)	(.012)	(.014)
Trade(-1)		-.008		-.012
		(.007)		(.007)
Finance(-1)		.090		.034
		(.085)		(.104)
Inflation		-.003		-.001
		(.003)		(.003)
CA(-1)*Trade(-1)		.000		.000
		(.000)		(.000)
CA(-1)*Finance(-1)		.000		-.000
		(.001)		(.001)
CA(-1)*Inflation		-.001		-.001
		(.001)		(.001)
Obs.	2784	2400	2567	2316
R^2	.59	.60	.61	.60

Notes: Dependent Variable: Current Account as % of GDP

Interestingly, even if one fully adopts the same model specifications as Herrmann does, it does not alter the main conclusion. It primarily affects the additional control variables of the augmented model. They turn out to have no impact anymore. However, the estimations are no different to previous results with regard to the parameter of interest. As a consequence, Herrmann's conjecture that "the different findings [as compared to Chinn and Wei] are not

Table 7a: Current Account Adjustment – FGLS (with lags), by Country Groups (WEO)

	Industrial		Non-Industrial		Non-Industrial, Non-Oil Exporter	
	Basic Model	Augmented Model	Basic Model	Augmented Model	Basic Model	Augmented Model
CA(-1)	.794	.865	.641	.606	.646	.607
	(.039)***	(.045)***	(.028)***	(.037)***	(.029)***	(.039)***
REGIME(-1)	.052	.163	.122	.147	.108	.122
	(.118)	(.110)	(.048)***	(.065)**	(.050)**	(.070)*
CA(-1)*REGIME(-1)	-.027	-.033	-.004	.006	-.005	.002
	(.016)*	(.024)	(.009)	(.012)	(.009)	(.013)
Trade(-1)		.010		-.013		-.010
		(.008)		(.008)		(.008)
Finance(-1)		-.227		.150		.090
		(.095)**		(.132)		(.127)
Inflation		-.074		-.002		-.001
		(.018)***		(.003)		(.003)
CA(-1)*Trade(-1)		.000		-.000		-.000
		(.000)**		(.000)		(.000)
CA(-1)*Finance(-1)		-.002		.000		.001
		(.002)		(.002)		(.002)
CA(-1)*Inflation		-.007		-.002		-.001
		(.002)***		(.001)*		(.001)
Obs.	821	727	1963	1673	1854	1572
R^2	.75	.74	.53	.53	.53	.54

Notes: Dependent Variable: Current Account as % of GDP

Table 7b: Current Account Adjustment – FGLS (with lags and time effects), by Country Groups (WEO)

	High Income		Medium Income		Low Income	
Time Effects	Basic Model	Augmented Model	Basic Model	Augmented Model	Basic Model	Augmented Model
CA(-1)	.724	.785	.585	.581	.626	.570
	(.040)***	(.044)***	(.041)***	(.049)***	(.057)***	(.076)***
REGIME(-1)	.109	.126	.227	.253	.060	.017
	(.100)	(.118)	(.071)***	(.080)***	(.106)	(.126)
CA(-1)*REGIME(-1)	-.025	-.046	-.006	.013	-.005	.006
	(.030)	(.034)	(.016)	(.018)	(.027)	(.031)
Trade(-1)		-.010		-.012		-.011
		(.015)		(.010)		(.017)
Finance(-1)		-.233		.276		-.057
		(.141)*		(.168)		(.351)
Inflation		-.030		-.005		.008
		(.026)		(.004)		(.014)
CA(-1)*Trade(-1)		.000		.000		-.000
		(.000)**		(.000)		(.000)*
CA(-1)*Finance(-1)		-.003		.002		-.009
		(.003)		(.002)		(.005)*
CA(-1)*Inflation		-.003		-.004		-.000
		(.003)		(.001)		(.002)
Obs.	882	786	1091	1009	594	521
R^2	.69	.67	.57	.56	.57	.50

Notes: Dependent Variable: Current Account as % of GDP

only an issue of differences in the country sample, rather the methodology used to control for the exchange rate regime seems to matter for the outcome" cannot be confirmed. Considering

the present study study, it seems to support the view that the "conventional wisdom" is propagated as a truth with little justification or at least with insufficient empirical background. Following from this, one may suppose that instead of demonstrating a systematic causality between the exchange rate regime and the speed of current account adjustment, Hermann's finding is rather due to her specific choice of the relatively small sample. This supposition is especially sustained by the fact that also the subcategories do not indicate any robust impact of the exchange rate regime.

At this stage, we can assess the results of the first approach that tries to take care of the problem that CA_{it-1} is correlated with the fixed effects in the error term. When the data is transformed so as to eliminate the fixed effects by means of a FGLS estimator using fixed effects and panel corrected standard errors, the consequence is that we do not find evidence in favor of the "conventional wisdom". As could be seen in this section, this finding is independent of the specific treatment of some additional variables as endogenous. In summary, there is reason to doubt that "the chosen sample may not be decisive for the outcome, and (...) the different methodologies used to classify the exchange rate regime may, to a considerable extent, account for the fact that our results are different compared with the outcome of Chinn and Wei" as Herrmann claims in her work (2009, p. 14). On the contrary, this study indicates that other factors of the 11 catching-up countries from central, eastern, and southeastern Europe account for the different assessment on the validity of the "conventional wisdom".

4.3. The Size of External Imbalances

Can we claim with certainty an absence of a significant influence of the exchange rate flexibility on the speed of current account convergence? What is it then, that made the "conventional wisdom" conventional? In order to double-check the present "negative" finding, the present analysis points at convincing evidence supporting the "conventional wisdom" in the next part of the paper. In an unpublished draft, Ghosh et al. (2008, p. 6) argue that the *size* of external imbalances provides a more direct test of the claim that flexible exchange rates encourage corrective movements in the current account. Ex ante, we would expect higher imbalances for less flexible exchange rate regimes. Accordingly, the next

Table 9a: Current Account Balances – De jure Classification (Ghosh), country groups (WEO)

	Current Account Balance			Deficits			Surpluses		
	Mean	Std Err	Obs.	Mean	Std Err	Obs.	Mean	Std Err	Obs.
Full Sample									
All	-3.804	9.844	3138	-6.857	8.862	2328	4.971	6.776	810
Fixed	-4.569	11.426	1833	-7.875	10.177	1397	6.022	8.361	436
Interm.	-2.834	6.871	771	-5.180	6.326	560	3.393	3.599	211
FLoat	-2.575	6.962	534	-5.551	5.733	371	4.199	4.239	163
Industrial									
All	-.790	4.680	758	-3.440	3.158	462	3.347	3.529	296
Fixed	-2.355	4.758	249	-4.366	3.841	176	2.494	2.897	73
Interm.	.010	4.456	306	-2.721	2.692	171	3.470	3.798	135
Float	-.076	4.451	203	-3.092	2.160	115	3.867	3.487	88
Non-industrial									
All	-4.764	10.816	2380	-7.702	9.588	1866	5.905	7.928	514
Fixed	-4.917	12.110	1584	-8.381	10.694	1221	6.732	8.906	363
Interm.	-4.706	7.513	465	-6.261	7.116	389	3.257	3.236	76
FLoat	-4.108	7.744	331	-6.656	6.454	256	4.588	4.976	75
Non-Industrial/oil									
All	-5.331	9.039	2201	-7.728	8.056	1775	4.656	5.299	426
Fixed	-5.609	9.671	1467	-8.356	8.490	1168	5.124	5.716	299
Interm.	-4.983	7.609	419	-6.381	7.335	356	2.915	2.760	63
FLoat	-4.504	7.582	315	-6.720	6.491	251	4.184	4.809	64

Table 9b: Current Account Balances – De facto Classification (LYS), country groups (WEO)

	Current Account Balance			Deficits			Surpluses		
	Mean	Std Err	Obs.	Mean	Std Err	Obs.	Mean	Std Err	Obs.
Full Sample									
All	-3.586	8.950	3287	-6.897	7.362	2399	5.360	6.361	888
Fixed	-4.238	10.507	1921	-8.429	8.462	1374	6.291	7.276	547
Interm.	-2.588	6.906	614	-5.413	5.561	440	4.557	4.343	174
FLoat	-2.735	5.167	752	-4.415	4.197	585	3.150	3.745	167
Industrial									
All	-.274	4.969	714	-3.299	2.7645	419	4.022	4.178	295
Fixed	.112	5.237	332	-3.472	2.899	177	4.205	4.210	155
Interm.	.581	5.934	139	-3.273	3.066	81	5.962	4.634	58
Float	-1.290	3.673	243	-3.121	2.441	161	2.304	2.964	82
Non-industrial									
All	-4.505	9.571	2573	-7.658	7.793	1980	6.026	7.116	593
Fixed	-5.146	11.090	1589	-9.162	8.763	1197	7.116	8.033	392
Interm.	-3.515	6.900	475	-5.896	5.878	359	3.854	4.029	116
FLoat	-3.425	5.619	509	-4.906	4.603	424	3.966	4.228	85
Non-Industrial/oil									
All	-5.171	9.044	2368	-7.772	7.916	1883	4.925	5.283	485
Fixed	-6.066	10.355	1458	-9.328	8.881	1141	5.674	5.762	317
Interm.	-3.893	6.917	434	-6.029	6.011	338	3.627	4.064	96
FLoat	-3.596	5.351	476	-4.835	4.610	404	3.358	3.626	72

Notes: Means and Standard Errors reported as % of GDP

section examines the data by constructing tables that list the current account balances corresponding to different regimes. Because opposite signs cancel each other out when looking at the average current account balance only, separate columns for surpluses and deficits are included. Again, the de jure classification by Ghosh et al. (2003) and the de facto classification by Levy-Yeyati and Sturzenegger (2003a) are used to categorize regimes. Moreover, the panel is stratified along the WEO and the WDI country groups. The results are displayed in tables 9 (WEO, p. 25) and 10 (WDI, p. 43).

One basic pattern is common to all of the tables: they show very consistently that, on average, absolute current account balances as percent of GDP are substantially larger for fixed regimes than for more flexible ones. In addition, the size of absolute deviations rises when moving from floating to fixed. Mean values of the current account balances for the fixed category are greater than the mean values for all regime types taken together ("Fixed" vs. "All"). This holds true for the full sample, as well as the subcategories.[20] Due to the canceling out of opposite signs, it is important to note that the finding is not overthrown by looking at the columns for surpluses and deficits separately. Here, the figures exhibit the same distribution, as magnitudes are higher for both deficits and surpluses in fixed regimes.

When comparing not only the fixed category to the overall average, but also different categories among each other, the relation between the fixed category and the most flexible one is unequivocal. Mean values in the fixed category are systematically higher than the ones for "Float". Furthermore, it can be noted that the relation between the intermediate category and the floating category is less clear. Although, by and large, figures are smaller for floating regimes, the relationship changes for some subsamples. This can be seen in some of the country groups of the de jure measure. Overall, the results of the de facto measure accord better with the assumption that less flexible regimes are associated with higher imbalances, for the LYS classification shows incremental increases in mean values and standard deviations even when moving from floating to intermediate. It must be noted, however, that this relationship is not of primary interest for the present study. The main conclusion of both tables is that fixed exchange rates are associated with larger external positions. This finding applies to all country groups and is independent of the exchange rate classification we use.

[20] A seeming exception to this pattern is the industrial country group in table 9b and the high-income group in table 10b respectively. If we take a look at the columns for deficits and surpluses, however, it becomes clear that this is due to the canceling out of the two figures, which are taken for themselves both greater for fixed regimes.

Hence, this may provide reason to belief in the validity of the predominant view. It is reasonable to assume that larger sizes of trade balances are, on average, caused by greater current account persistence. The alternative explanation that systematically larger external positions accumulate much *faster* under fixed regimes without showing a higher degree of persistence is highly disputable. Moreover, it offers a good explanation for the historical examples from the beginning of the paper by demonstrating the same characteristics of these individual cases also for the whole period from 1970 to 2008.

Now, after having checked the negative assessment of the "conventional wisdom " by means of a different – albeit much simpler – method than estimating the rate of current account reversion, one might ask whether the predominant view really rests on a false belief. Doesn't the fact that fixed exchange rates are associated with systematically larger imbalances indicate that we should be able to find a robust relationship between current account persistence and the exchange rate regime? Why doesn't the disparate behavior of trade balances depending on different regimes show to be robust in the estimations? As a consequence of previous results, the author reconsiders the estimation methods employed so far in the next part of the paper and proposes an alternative way of how to estimate the issue under consideration.

4.4. Dynamic Panel Estimation

The model specifications as laid out in chapter 2 stand closely in line with the ones proposed by Chinn and Wei, as well as the ones used in the work by Herrmann. The main features were that a continuous regime variable is used instead of discrete dummy variables and that we tried to work around the issue of endogeneity by means of a fixed effects estimation. In the following course, the author adheres to the use of the z-score variable, since there is nothing inherently wrong with this way of measuring the exchange rate regime. As could be seen in chapter 2, it is not dissimilar to other well-established classifications, but yields the advantage of a more accurate measurement due to the finer distinction. By contrast, the paper wants to re-evaluate the use of the FGLS estimation for the issue at hand.

4.4.1. Endogeneity

As we have seen throughout the course of the analysis, endogeneity is the obvious, but at the same time also the most problematic issue of our econometric model. The current account adjustment process depends on the difference between the country-specific long-run equilibrium that we assume and the previous year's actual level, which argues for a dynamic model in which lags of the dependent variable are also regressors. Additionally, supposing that the exchange rate is only a determinant of the current account, but movements in the trade balance do not have an impact on the exchange rate regime would be dubious.[21] This is particularly true, if the exchange rate regime is measured by a volatility measure. Thus, there exists a trade-off between the more accurate measurement of the exchange rate regime behavior and the endogeneity issue. Herrmann acknowledges this fact when she writes: "The *z-scores* measure of de facto exchange rate volatility proposed by Ghosh, Gulde and Wolf (2003) reflects the actual behavior of the exchange rate regime more precisely than a discrete variable. Furthermore, we avoid the problems inherent to a dummy variable approach which are insignificant results and an arbitrary classification of the dummies especially for intermediate regimes etc. On the other hand, this approach may increase the endogeneity problem, implying that in periods of rapid current account adjustment, greater exchange rate volatility may be observed." (p. 3).

Until now, it was tried to take care of the endogeneity issue by transforming the data such that the fixed effects are removed. The problem is that this does not eliminate the dynamic panel bias (Nickel 1981).[22] One of the regressors, the lagged independent variable CA_{it-1}, is still correlated with the error term after the transformation. Following Roodman (2006), under the fixed effects estimator the lagged independent variable amounts to: $CA^{*}_{it-1} = CA_{it-1} - \frac{1}{T-1}(CA_{i2} + ... + CA_{iT})$. The error term is equal to: $\varepsilon^{*}_{it} = \varepsilon_{it} - \frac{1}{T-1}(\varepsilon_{i2} + ... + \varepsilon_{iT})$. The problem in the discussion is that the CA_{it-1} term in CA^{*}_{it-1} correlates negatively with the $\frac{1}{T-1}\varepsilon_{it-1}$ in ε^{*}_{it} while, symmetrically, the $-\frac{1}{T-1}CA_{it}$ and ε_{it} are also correlated. What is even more problematic is that the continuing endogeneity cannot be eliminated by instrumenting CA^{*}_{it-1} with lags of CA_{it-1}, because they are also included in the transformed error ε^{*}_{it}. We take this problem serious by adopting an alternative way of estimating the model. In order to remove

[21] Similarly, Pan (2006) shows that movements of the current account help forecast exchange rates.
[22] See Annex C for details.

the dynamic panel bias the author performs a different transformation of the data. Since the first-difference transformation has the weakness of magnifying the gaps in unbalanced panels,[23] a System generalized method of moments (GMM) estimator developed by Blundell and Bond (1998) is employed.

4.4.2. Estimation Results

The estimator is specifically designed for panel analysis. The present model fits the prerequisites, as laid out in Roodman (2006, p. 15), extraordinarily well. First of all, we consider a dynamic process, with current realizations of the dependent variable influenced by past ones. Moreover, there are arbitrarily distributed fixed effects, which argues in favor of a panel set-up. Thirdly, some variables are endogenous. Endogenous variables are potentially correlated with past and present errors. In the present case, this holds particularly true for the exchange rate volatility measure. What is more, the idiosyncratic disturbances (apart from the fixed effects) have country-specific patterns of heteroskedasticity and serial correlation. Also, some regressors like the lagged current account are predetermined but not strictly exogenous, i.e. they are independent of current disturbances, but influenced by past ones. Furthermore, our data set is a panel with moderately large *N* and moderately small *T*. Lastly, we lack "good" instruments: the only ones available are based on the lags of the instrumented variables. In short, the estimator fits extremely well to the issue that is being investigated. The only point which might not be completely fulfilled is the desirable property that the idiosyncratic disturbances are uncorrelated across countries. Section 5.4.3 is going to come back to this problem.

Using the dynamic panel estimation method, the lagged dependent variable CA_{it-1} is instrumented, just like any other similarly endogenous variable, as well. The simplest way of incorporating either CA_{it-2} or ΔCA_{it-2} as instruments for CA^{*}_{it-1} is with Two Stage Least Squares (2SLS), which yields the Anderson-Hsiao (1982) difference and levels estimator.[24] However, as demonstrated in Roodman (2006, p. 4ff.), 2SLS is only efficient under the hypothesis of homoskedasticity. The present paper follows an approach fully developed in Blundell and Bond (1998) to increase efficiency. The rationale for this choice is sustained by

[23] Cf. Roodman (2006), p. 20 and Blundell and Bond (1998), p. 115

[24] Herrmann makes use of an instrumental variable (IV) estimator according to the Anderson-Hsiao (1982) estimator in order to provide a robustness check for her results (cf. p. 12)

the fact that first-differencing, as an alternative way of dealing with the dynamic panel bias, "has been found to have large finite sample bias" (Blundell and Bond 1998, p. 115). In addition, instruments become weaker when the autoregressive parameter increases towards unity. The latter is particularly true for the given model, as could be seen in previous estimations. The estimator uses lagged *differences* of the endogenous variables as instruments to make them exogenous to the fixed effects, since lagged *levels* are weak instruments in the differenced equations whenever ρ_1 is close to unity.[25] This approach basically means that we assume changes in the instrumenting variables to be uncorrelated with the fixed effects. For this study, it follows that we instrument CA_{it-1} with ΔCA_{it-1} and variables including our exchange rate volatility measure accordingly (i.e. $Regime_{it}$ and $CA_{it-1}*Regime_{it}$).

Within our context, there is the risk of over-identifying restrictions. The System GMM estimator can easily generate large amounts of moment conditions, with the instrument count quadratic in the time dimension of the panel, *T*. Finite samples sometimes lack adequate information to estimate such large matrices. Thus, the estimation reports two tests of whether the instruments appear exogenous as a group (Sargan and Hansen statistics). Yet, the Sargan statistic should be disregarded, because is not robust to heteroskedasticity or autocorrelation. Conversely, the Hansen statistic is robust and should be considered instead. Nevertheless, it has its own drawback, since it can be greatly weakened by instrument proliferation to the point where it generates implausibly good p-values of 1.000 (Anderson and Sørenson 1996, Bowsher 2002, cit. in: Roodman 2006, p. 14).

Taking everything into account, the System GMM estimator is more suitable than the fixed effects estimation for the issue at hand, but it should not be relied on when the number of instruments is large relative to the number of observations (although it is still consistent in these cases). Unfortunately, there exists no clear-cut definition on how many instruments is "too many". In this study, we disregard cases where Stata displays a warning that the number of instruments might be too large relative to the number of observations and/or we obtain a p-value of 1.000 for the Hansen statistic.

Table 11 reports the outcome of the System generalized method of moments (GMM) estimator. Column one displays the results for the basic model and the second column the

[25] Cf. Blundell and Bond (1998), p. 123

ones for the augmented model. Columns three to eight display the outcome for both equations when stratifying the panel along the WEO country groups. By taking a look at the Hansen statistic, one can recognize that the regression for the industrial country group seems to be over-identified. Results for this category are reported for the sake of completeness and in order to maintain the same mode of representation only. The same is true for the WDI country group classification.[26] Yet, the problem does not arise for the other two subsamples of table 11. They, in turn, yield valuable results for the present examination. All estimations include time dummies.

Table 11: Current Account Adjustment – Dynamic Panel Estimations, Country Groups (WEO)

	All Countries		Industrial		Non-Industrial		Non-Industrial, Non Oil	
	Basic Model	Augmented Model	Basic Model	Augmented Model	Basic Model	Augmented Model	Basic Model	Augmented Model
CA(-1)	.723	.798	.630	.411	.663	.683	.642	.649
	(.075)***	(.106)***	(.075)***	(.069)***	(.086)***	(.114)***	(.084)***	(.120)***
REGIME	-.235	-.650	.489	.273	-.301	-.588	-.284	-.529
	(.329)	(.284)**	(.316)	(.310)	(.338)	(.278)**	(.328)	(.272)*
CA(-1)*REGIME	-.125	-.207	.054	.113	-.121	-.178	-.108	-.162
	(.044)***	(.051)***	(.033)	(.046)**	(.035)***	(.048)***	(.045)**	(.047)***
Trade		-.005		.001		-.007		-.006
		(.004)		(.003)**		(.006)		(.006)
Finance		.334		.336		-.085		-.037
		(.107)***		(.099)***		(.145)		(.148)
Inflation		.024		-.051		.022		.020
		(.009)**		(.023)**		(.010)**		(.010)**
CA(-1)*Trade		-.000		.001		.000		.000
		(.001)		(.000)*		(.001)		(.001)
CA(-1)*Finance		.040		.118		-.019		-.021
		(.018)**		(.016)***		(.021)		(.025)
CA(-1)*Inflation		.008		-.009		.007		.006
		(.002)***		(.003)***		(.003)***		(.002)***
Obs.	2514	2275	766	697	1748	1578	1650	1484
Instruments	132	138	132	138	132	138	132	138
Arellano-Bond AR(1)	P>z=.000	P>z=.000	P>z=.000	P>z=.000	P>z=.000	P>z=.000	P>z=.000	P>z=.000
Arellano-Bond AR(2)	P>z=.194	P>z=.307	P>z=.212	P>z=.131	P>z=.401	P>z=.505	P>z=.361	P>z=.358
Sargan-Test	P>χ^2=.000	P>χ^2=.000	P>χ^2=.000	P>χ^2=.000	P>χ^2=.000	P>χ^2=.004	P>χ^2=.000	P>χ^2=.005
Hansen-Test	P>χ^2=.237	P>χ^2=.340	P>χ^2=1.000	P>χ^2=1.000	P>χ^2=.598	P>χ^2=.981	P>χ^2=.876	P>χ^2=.998

Notes: Dependent Variable: Current Account as % of GDP

The main conclusions of table 11 are as follows. Most importantly, it reveals that a greater degree of exchange rate flexibility (as measured by the exchange rate volatility) facilitates faster adjustment of the current account. The autoregressive parameter moves within the same margin as before, with around 0.723 for the full sample and lower figures for the non-industrial country groups. Contrary to what we have seen in previous fixed effects estimations, the adjustment process now depends on the exchange rate volatility. Considering

[26] Likewise, the same issue arises for the WDI classification.

the interaction term between the lagged current account and the exchange rate regime variable, the autoregressive parameter declines from 0.723 to 0.598 in the basic model (CA_{it-1} + CA_{it-1}*$Regime_{it}$). The coefficient of interest turns out to be negative and is highly statistically significant for all relevant cases. Thus, greater exchange rate volatility decreases current account persistence. Another way to put it is that the implied rate of reversion is higher for flexible regimes. Whereas the exchange rate volatility measure equals zero for a totally fixed regime and its rate of reversion amounts to 0.277, it increases along greater magnitudes of exchange rate flexibility. The effect is even more pronounced when we account for additional determinants of the current account adjustment by the inclusion of supplementary control variables. The non-industrial country group replicates the same pattern of the full sample. As shown in column five, current account persistence declines from 0.663 for totally fixed regimes to 0.542 when considering the interaction term. Again, the results are not overthrown by the inclusion of additional controls. Furthermore, excluding oil-exporting countries does not change the outcome.

By and large, the control variables behave according to the expectations and are never contrary to them whenever they are statistically distinct from zero. The Arellano-Bond tests check for autocorrelation aside from the fixed effects. They are applied to the residuals in differences. Since $\Delta\varepsilon_{it}$ is mathematically related to $\Delta\varepsilon_{it-1}$ via the shared ε_{it-1} term, negative first-order serial correlation is expected in differences and evidence of it is uninformative. Thus, we focus on second-order correlation in differences to check for first-order serial correlation in levels, because this will detect correlation between the ε_{it-1} in $\Delta\varepsilon_{it}$ and the ε_{it-2} in $\Delta\varepsilon_{it-2}$.[27] The Arellano-Bond AR(2) test statistic does not indicate a misspecification and justifies the use of second lags and larger for the endogenous variables.

In summary, we obtain a fundamentally different result than previous fixed effects estimations when the relationship is modeled according to the System GMM estimator. Arguably, the latter is more germane to the question of whether more flexible exchange rate regimes are conducive to the adjustment of current account imbalances. If the relationship is estimated in a way that we fully correct the dynamic panel bias while additionally taking into account heteroskedasticity, serial correlation of disturbances, and a moderately large autoregressive parameter, we come to a conclusion that stands in line with the "conventional

[27]See Roodman (2006), p. 35

wisdom". In other words, it provides robust empirical evidence for the predominant view that more flexible exchange rate regimes exhibit faster current account convergence than less flexible regimes. The finding fills an important gap for a lot of policy recommendations by buttressing them with empirical background. Also, because a sizable number of countries over a period of 38 years are concerned, our study discloses a causality that seems to be fairly general.

4.4.3. Discussing the Results

In this part of the paper, three potential sources of criticism are made out and tried to answer one at a time. First, one might argue that a weakness of the alternative estimation method the paper proposes would be the difficulty to scrutinize smaller data sets such as the industrial country group. As could be seen, the issue of over-identification emerges for this group. The dynamic panel estimator, which is arguably the most appropriate for our purpose, is not applicable for small data sets when trying to fully take care of the endogeneity issue by instrumenting all potentially endogenous variables. Reducing the number of instruments instead of increasing the number of observations so as to consider smaller samples is not possible without changing the fundamental specifications of the model. As laid out above, there is good reason to instrument both regime variables and the lagged current account; treating one not as endogenous simply to reduce instruments would not be justified.[28] At that point, the reader should keep in mind that the question under investigation is a general one. We should not be gratuitously concerned with the fact that we are not able to derive statements that apply only to specific countries and/or limited time scopes. The principal motivation of the present undertaking was to test economic theory, which essentially suggests that inflexible exchange rates tend to promote the accumulation of imbalances which might entail deviations from market equilibrium. For the issue at hand, the paper is confident to claim that the System GMM estimator is superior to other estimation methods on basis of the considerations described in the previous section. Another point that mitigates concerns about the unreliability for the industrial country group is the finding made by Levy-Yeyati and Sturzenegger (2003b). In their work, they demonstrate that the exchange rate regime is relevant in an emerging market context, but not for industrial countries. Here, the present estimations are reliable for the non-industrial country sample.

[28] The "collapse" command is used in all estimations to reduce the proliferation of instruments. See Section 4.1 in Roodman (2006) for the detailed syntax of the estimator.

Secondly, it was already mentioned that the estimator requires the idiosyncratic disturbances to be uncorrelated across individuals. In the present context, however, it is reasonable to assume a certain type of cross-individual correlation, i.e. contemporaneous correlation. In the case of contemporaneous correlation, the disturbances are correlated between the panel units in the same period. Consider for example a large exogenous shock on the economy of one country. Countries which maintain close trade relations to that country might also be affected instantaneously in the same period via their trade balances. Yet, as shown in Roodman (2006, p. 34ff.), contemporaneous correlation is prevented by the use of time dummies. The assumption of no correlation across countries holds with the inclusion of time effects. Since time dummies are included in all of the estimations, this fact does not pose a reason for concern.

A third criticism that might be advanced is that it is not possible to instrument the trade and finance variables of the augmented model in addition to the regime variables. In part 4.2.2 of the present work, the author followed Herrmann in her model specification that considered the two determinants to be potentially endogenous. Under the System GMM estimator, this would render the results to be invalid, since the number of instruments would be too high relative to the number of observations. This problem cannot be easily corrected. It must be noted, however, that the treatment of these two variables as endogenous did not yield any different results in previous estimations than without their special consideration. Throughout the study, conclusions on the coefficients of interest were never overthrown by the inclusion of additional controls, regardless of their treatment as exogenous or endogenous. Estimations for the augmented model did not indicate an omittance of determinants that would have fundamentally altered the relationship. Therefore, even if the two additional control variables cannot be treated as endogenous in order to provide another robustness test, one should not overestimate their importance for the main conclusions of the study.

5. Concluding Remarks

In this paper, the impact of the exchange rate regime flexibility on the current account adjustment process was investigated. For the ongoing debate on potentially dangerous external positions, an exact understanding of this mechanism is crucial. Starting from the position which is predominantly assumed to be true, i.e. the view that flexible exchange rate

regimes facilitate current account adjustments, and the surprisingly little empirical research supporting it, the paper demonstrated new systematic evidence supporting the "conventional wisdom".

The first part of the study provided a short overview over two pertinent works by Chinn and Wei (2009) on the one hand, and Herrmann (2009) on the other hand. As one could see in section 2.1, it was not possible to make out the decisive reason for their contrary findings due to two essential difficulties. First, their data sets differ too greatly in size and scope. Second, the models they use in order to estimate the relationship diverge importantly in their specifications. By the application of the same methodology to a data set comprising 171 countries for the 1970 to 2008 period, it was possible to test previous results on a large scale and pointed out that the specific choice of the sample instead of the different methodological approaches is more likely to have resulted in the opposing conclusions. As the fixed effects estimations revealed, the "conventional wisdom" did not seem to be robust on a larger scale, thereby confirming Chinn and Wei's "negative" finding.

By taking into account the size of external imbalances, the assessment of the fixed effects results left room for doubt that the predominant view should be rejected once and for all. It was shown that fixed exchange rate regimes are systematically associated with larger external positions than other types of regimes. Triggered by this, the author re-evaluated the use of a fixed effects estimator for the issue at hand and pointed to its fundamental weaknesses with respect to the dynamic panel bias. Following, the paper argues in favor of a dynamic panel estimator, the System GMM estimator developed in Blundell and Bond (1998), because there exist good reason to believe that this estimation method is more germane to the relationship under investigation. This was demonstrated in sections 5.4.1 and 5.4.2. Once this dynamic panel estimation was applied to the model of interest, we obtained essentially different results to the ones the fixed effects estimations produced. Now, a strong and robust relationship between exchange rate regimes and adjustment speed of current accounts could be observed. From the author's point of view, due to the structural advantages of the System GMM estimator, these latter results should be considered instead of any fixed effects estimations.

The present paper contributes to the ongoing debate on global imbalances by providing new empirical evidence in support of the view that greater exchange rate flexibility

acts conducive to current account adjustments. In an area where the discussed implications for the world economy are far-reaching and the empirical research very little, this finding fills an important gap. A concrete policy implication of the present study is that, on a global scale, more exchange rate flexibility is needed in order to promote a smooth unwinding of today's current account imbalances. The Asian countries, China in particular, will have to acknowledge the limitations of export-led growth, establishing sustainable growth on a broader basis than a unique focus on the sector of traded goods. A higher exchange rate flexibility, which is inevitable, will be good for the adjustment of today's imbalances. However, the revaluation of the renminbi should be gradual, since it would otherwise risk to kill the "golden goose of economic growth" (Eichengreen 2007, p. 119) thereby harming the world economy as a whole.[29] Bordo (2003, p. 32 f.) highlights that successful floating by today's advanced countries required achieving financial maturity. The same will be required for the rest of the world. In order to achieve an abatement of imbalances in areas where a higher degree of exchange rate flexibility is not possible, such as the European Union, more coordination and integration with respect to fiscal policy would be desirable.

[29] Similarly, Huang (2010) and Huang and Kunyu (2010) argue that global economic growth would be about 1.5 percentage points lower if China revalued its currency.

Bibliography

Aisen, A. and D. Eterovic (2010): "Global imbalances: Are emerging markets the new guest at the party?", http://www.voxeu.org/index.php?q=node/4676, Access on: 17.02.2010

Anderson, T. and C. Hsiao (1982): "Formulation and estimation of dynamic models using panel data", Journal of Econometrics, 18, pp. 47–82

Baldwin, R. (2009): "The Great Trade Collapse: Causes, Consequences and Prospects", A VoxEU.org Publication, http://www.voxeu.org/reports/great_trade_collapse.pdf

Baldwin, R. and D. Taglioni (2009): "The illusion of improving global imbalances", http://www.voxeu.org/index.php?q=node/4209, Access on: 16.01.2010

Batini, N., Cova, P., Pisani, M. and A. Rebucci (2009): "Global Imbalances – The Role of Non-Tradable Factor Productivity in Advanced Economies", IMF Working Paper WP/09/63

Bibow, J. (2006): "Global Imbalances, Bretton Woods II, and Euroland's Role in All This", The Levy Economics Institute Working Paper No. 486

Blanchard, O. and G.M. Milesi-Ferretti (2009): "Global Imbalances: In Midstream?", IMF Staff Position Note SPN/09/29

Blundell, R. and S. Bond (1998): "Initial conditions and moment restrictions in dynamic panel data models", Journal of Econometrics 87 (1998), pp. 115 — 143

Bordo, M. (2003): "Exchange Rate Regime Choice in Historical Perspective", NBER Working Paper No. 9654

Bordo, M. (2005): "Historical Perspective on Global Imbalances", NBER Working Paper Nr. 11383

Bracke, T., Bussière, M., Fidora, M. and R. Straub (2008): "A Framework for Assessing Global Imbalances", European Central Bank, Occasional Paper Series No. 78

Brender, A. and F. Pisani (2007): "Global Imbalances: Is the World Economy Really at Risk?", Belgium: DEXIA

Caballero, R., Farhi, E. and P. Gourinchas (2008): "Financial Crash, Commodity Prices and Global Imbalances", NBER Working Paper No. 14521

Chinn, M. and H. Ito (2008): "A New Measure of Financial Openness", Journal of Comparative Policy Analysis: Research and Practice, Vol. 10, No. 3, pp. 309 – 322

Chinn, M. and S. Wei (2009): "A Faith-based Initiative: Does a Flexible Exchange Rate Regime Really Facilitate Current Account Adjustment?", HKIMR Working Paper No.12/2009

Dooley, M., Folkerts-Landau, D. and P. Garber (2003): "An Essay on the Revived Bretton Woods System", NBER Working Paper No. 9971

Eichengreen, B. (2007): "Global Imbalances and the Lessons of Bretton Woods", MIT Press, Cambridge

Eichengreen, B. (2008): "Globalizing Capital – A History of the International Monetary System", 2nd ed., Princeton: Princeton University Press

Faruqee, H., Laxton, D., Muir, D. and P. Pesenti (2006): "Would Protectionism Defuse Global Imbalances? A Scenario Analysis", CEPR Discussion Paper No. 5993

Ghosh, A., Gulde, A., and H. Wolf (2003): "Exchange Rate Regimes – Choices and Consequences", MIT Press, Cambridge

Ghosh, A., Terrones, M. and J. Zettelmeyer (2009): "Exchange Rate Regimes and External Adjustment: New Answers to an Old Debate?", Unpublished manuscript, http://www.iheid.ch/webdav/site/international_economics/shared/international_economics/events/Swoboda/Zettelemeyer-ERRs%20and%20external%20adjustment%203-1.pdf

Gust, C., Leduc, S., and N. Sheets (2008): "The Adjustment of Global External Balances: Does Partial Exchange Rate Pass-Through to Trade Prices Matter

Herrmann, S. (2009): "Do we really know that flexible exchange rates facilitate current account adjustment? Some new empirical evidence for CEE countries", Deutsche Bundesbank Discussion Paper Series 1: Economic Studies No 22/2009

Huang, Y. and T. Kunyu (2010): "Causes and Remedies of China's External Imbalances", China Center for Economic Research, Working Paper Series No. E2010002

Huang, Y. (2010): "Krugman's Chinese renminbi Fallacy", http://www.voxeu.org/index.php?q=node/4801, Access on: 26.03.2010

Keller, P. and T. Richardson (2003): "Nominal Anchors in the CIS", IMF Working Paper WP/03/179

Krugman, P. and Obstfeld, M. (2009): "International Economics – Theory and Policy", 8th ed., Boston: Pearson International Edition

Levy-Yeyati, E. and F. Sturzenegger (2003a): "A de facto Classification of Exchange Rate Regimes: A Methodological Note", http://profesores.utdt.edu/~ely/AppendixAER.pdf

Levy-Yeyati, E. and F. Sturzenegger (2003b): "To Float or to Fix: Evidence on the Impact of Exchange Rate Regimes on Growth", American Economic Review 93 (4)

Meissner, M. and A. Taylor (2006): "Losing our Marbles in the New Century? The Great Rebalancing in Historical Perspective",NBER Working Paper No. 12580

Meredith, G. (2007): "Debt Dynamics and Global Imbalances: Some Conventional Views Reconsidered", IMF Working Paper WP/07/4

Mishkin, F. (2007a): "Monetary Policy Strategy", MIT Press, Cambridge, MA 01242

Mishkin F. (2007b): "Will Monetary Policy Become More of a Science?", Paper prepared for the Deutsche Bundesbank conference "Monetary Policy over 50 years", Frankfurt am Main, Germany

Nickell, S. (1981): "Biases in dynamic models with fixed effects", Econometrica 49 (6), pp. 1417–26

Obstfeld, M. and K. Rogoff (2009): “Global Imbalances and The Financial Crisis: Products of Common Causes”, Paper prepared for the Federal Reserve Bank of San Francisco Asia Economic Policy Conference, Santa Barbara, USA

Pan, H. (2006): “The Dynamics of External Adjustment: Evidence from Emerging Markets”, Asia-Pacific Economic Association, Paper prepared for the APEA Conference 2006, Seattle, USA

Reinhart, C. and K. Rogoff (2004): “The Modern History of Exchange Rate Arrangements: A Reinterpretation”, Quarterly Journal of Economics, 119 (1), pp. 1-48

Roodman, D. (2006): “How to Do xtabond2: An Introduction to Difference and System GMM in Stata”, Center For Global Development, Working Paper Number 103

Wolf, M. (2010): “China and Germany unite to impose global deflation“, http://www.ft.com/cms/s/0/cd01f69e-3134-11df-8e6f-00144feabdc0.html, Access on: 20.03.2010

Xafa, M. (2007): “Global Imbalances and Financial Stability”, Journal of Policy Modeling, Volume 29, pp. 783-796

ANNEX

A. Additional Tables

Table 5a: Current Account Adjustment – FGLS, by Country Groups (WDI)

	High Income		Medium Income		Low Income	
	Basic Model	Augmented Model	Basic Model	Augmented Model	Basic Model	Augmented Model
CA(-1)	.743	.690	.657	.441	.630	.322
	(.030)***	(.085)***	(.031)***	(.073)***	(.045)***	(.133)**
REGIME(-1)	.098	.016	.075	.074	.111	.074
	(.091)	(.130)	(.055)	(.068)	(.061)*	(.082)
CA(-1)*REGIME	-.006	-.022	-.002	.004	.005	.003
	(.011)	(.021)	(.011)	(.013)	(.011)	(.014)
Trade		-.003		-.017		.005
		(.012)		(.008)**		(.018)
Finance		.010		.241		-.053
		(.127)		(.137)*		(.406)
Inflation		-.017		.009		.003
		(.020)		(.005)*		(.011)
CA(-1)*Trade		.000		.002		.004
		(.001)		(.001)***		(.002)**
CA(-1)*Finance		.058		-.024		.003
		(.019)***		(.019)		(.054)
CA(-1)*Inflation		-.001		.001		.001
		(.002)		(.001)		(.002)
Obs.	980	855	1318	1163	702	590
R^2	.68	.66	.60	.59	.57	.53

Notes: Dependent Variable: Current Account as % of GDP

Table 5b: Current Account Adjustment – FGLS (with time effects), by Country Groups (WDI)

	High Income		Medium Income		Low Income	
Time Effects	Basic Model	Augmented Model	Basic Model	Augmented Model	Basic Model	Augmented Model
CA(-1)	.736	.713	.601	.411	.639	.378
	(.036)***	(.101)***	(.033)***	(.079)***	(.047)***	(.140)***
REGIME(-1)	.081	-.045	.100	.073	.125	.070
	(.111)	(.159)	(.062)	(.069)	(.071)*	(.092)
CA(-1)*REGIME	-.010	-.045	.002	.004	.009	.006
	(.014)	(.025)*	(.012)	(.014)	(.012)	(.014)
Trade		-.009		-.022		-.016
		(.015)		(.009)**		(.019)
Finance		-.028		.161		.183
		(.148)		(.158)		(.414)
Inflation		-.007		.009		.006
		(.024)		(.005)*		(.012)
CA(-1)*Trade		-.000		.002		.004
		(.001)		(.001)***		(.002)**
CA(-1)*Finance		.066		-.027		.055
		(.021)***		(.020)		(.058)
CA(-1)*Inflation		.001		.000		.000
		(.003)		(.002)		(.002)
Obs.	903	795	1178	1080	626	547
R^2	.70	.66	.64	.62	.61	.54

Notes: Dependent Variable: Current Account as % of GDP

Table 8a: Current Account Adjustment – FGLS (with lags), by Country Groups (WDI)

	High Income		Medium Income		Low Income	
	Basic Model	Augmented Model	Basic Model	Augmented Model	Basic Model	Augmented Model
CA(-1)	.747	.822	.652	.598	.647	.632
	(.036)***	(.042)***	(.037)***	(.049)***	(.056)***	(.072)***
REGIME(-1)	.074	.094	.174	.232	.004	-.009
	(.094)	(.116)	(.051)***	(.073)***	(.109)	(.128)
CA(-1)*REGIME(-1)	-.020	-.038	-.005	.013	-.015	-.009
	(.015)	(.023)*	(.012)	(.017)	(.018)	(.021)
Trade(-1)		-.000		-.014		.000
		(.011)		(.009)		(.017)
Finance(-1)		-.188		.280		-.010
		(.117)		(.141)**		(.347)
Inflation		-.061		-.005		.005
		(.019)***		(.004)		(.013)
CA(-1)*Trade(-1)		.000		-.000		-.000
		(.000)**		(.000)		(.000)
CA(-1)*Finance(-1)		-.002		.002		-.008
		(.003)		(.002)		(.004)*
CA(-1)*Inflation		-.006		-.003		.001
		(.002)**		(.001)**		(.002)
Obs.	942	816	1193	1044	649	540
R^2	.68	.67	.52	.52	.54	.52

Notes: Dependent Variable: Current Account as % of GDP

Table 8b: Current Account Adjustment – FGLS (with lags and time effects), by Country Groups (WDI)

	High Income		Medium Income		Low Income	
Time Effects	Basic Model	Augmented Model	Basic Model	Augmented Model	Basic Model	Augmented Model
CA(-1)	.724	.785	.585	.581	.626	.570
	(.040)***	(.044)***	(.041)***	(.049)***	(.057)***	(.076)***
REGIME(-1)	.109	.126	.227	.253	.060	.017
	(.100)	(.118)	(.071)***	(.080)***	(.106)	(.126)
CA(-1)*REGIME(-1)	-.025	-.046	-.006	.013	-.005	.006
	(.030)	(.034)	(.016)	(.018)	(.027)	(.031)
Trade(-1)		-.010		-.012		-.011
		(.015)		(.010)		(.017)
Finance(-1)		-.233		.276		-.057
		(.141)*		(.168)		(.351)
Inflation		-.030		-.005		.008
		(.026)		(.004)		(.014)
CA(-1)*Trade(-1)		.000		.000		-.000
		(.000)**		(.000)		(.000)*
CA(-1)*Finance(-1)		-.003		.002		-.009
		(.003)		(.002)		(.005)*
CA(-1)*Inflation		-.003		-.004		-.000
		(.003)		(.001)		(.002)
Obs.	882	786	1091	1009	594	521
R^2	.69	.67	.57	.56	.57	.50

Notes: Dependent Variable: Current Account as % of GDP

Table 10a: Current Account Balances – De jure Classification (Ghosh), country groups (WDI)

	Current Account Balance			Deficits			Surpluses		
	Mean	Std Err	Obs.	Mean	Std Err	Obs.	Mean	Std Err	Obs.
Full Sample									
All	-3.804	9.844	3138	-6.857	8.862	2328	4.971	6.776	810
Fixed	-4.569	11.426	1833	-7.875	10.177	1397	6.022	8.361	436
Interm.	-2.834	6.871	771	-5.180	6.326	560	3.393	3.599	211
FLoat	-2.575	6.962	534	-5.551	5.733	371	4.199	4.239	163
High Income									
All	-.677	11.256	912	-4.677	11.213	546	5.290	8.298	366
Fixed	-1.532	16.272	396	-6.629	15.843	259	8.105	12.240	137
Interm.	.0298	4.445	306	-2.704	2.691	170	3.448	3.793	136
Float	-.095	4.534	210	-3.222	2.357	117	3.838	3.408	93
Medium Income									
All	-4.516	9.490	1400	-7.494	8.471	1068	5.061	5.357	332
Fixed	-4.927	10.918	867	-8.844	9.671	634	5.729	5.814	233
Interm.	-3.716	6.044	350	-5.121	5.476	291	3.213	3.341	59
FLoat	-4.100	7.267	183	-6.337	6.330	143	3.894	4.082	40
Low Income									
All	-6.048	7.688	826	-7.570	6.934	714	3.657	4.531	112
Fixed	-6.135	6.785	570	-7.297	6.220	504	2.734	3.636	66
Interm.	-7.769	10.258	115	-9.606	9.828	99	3.596	2.923	16
FLoat	-4.290	8.366	141	-6.995	6.655	111	5.721	6.179	30

Notes: Means and Standard Errors reported as % of GDP

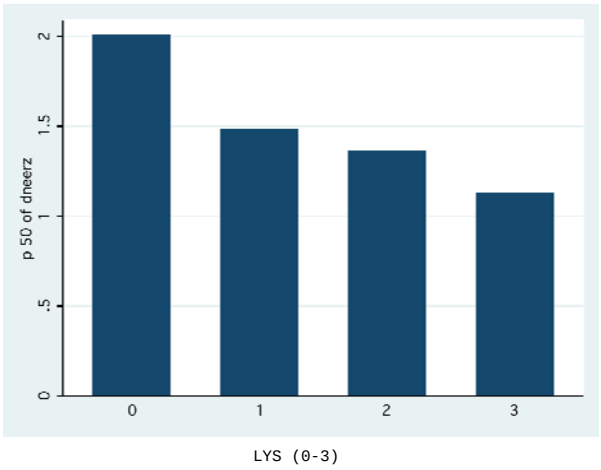
Table 10b: Current Account Balances – De facto Classification (LYS), country groups (WDI)

	Current Account Balance			Deficits			Surpluses		
	Mean	Std Err	Obs.	Mean	Std Err	Obs.	Mean	Std Err	Obs.
Full Sample									
All	-3.586	8.950	3287	-6.897	7.362	2399	5.360	6.361	888
Fixed	-4.238	10.507	1921	-8.429	8.462	1374	6.291	7.276	547
Interm.	-2.588	6.906	614	-5.413	5.561	440	4.557	4.343	174
FLoat	-2.735	5.167	752	-4.415	4.197	585	3.150	3.745	167
High Income									
All	-.155	7.860	911	-4.390	4.753	528	5.684	7.553	383
Fixed	.072	9.548	522	-5.475	5.789	286	6.795	8.869	236
Interm.	.788	5.772	142	-3.141	2.928	79	5.716	4.543	63
Float	-1.177	3.834	247	-3.093	2.422	163	2.539	3.308	84
Medium Income									
All	-4.593	9.788	1584	-7.894	8.583	1192	5.444	5.404	392
Fixed	-5.700	11.951	880	-10.349	10.322	635	6.350	5.968	245
Interm.	-3.321	6.368	342	-5.561	5.303	261	3.894	3.514	81
FLoat	-3.104	5.223	362	-4.685	3.942	296	3.984	4.308	66
Low Income									
All	-5.517	7.118	792	-7.096	6.168	679	3.972	4.649	113
Fixed	-6.093	7.027	519	-7.603	5.961	453	4.268	4.637	66
Interm.	-4.344	8.119	130	-6.822	7.094	100	3.913	5.454	30
FLoat	-4.490	6.222	143	-5.491	5.865	126	2.928	2.911	17

Notes: Means and Standard Errors reported as % of GDP

B. Additional Figures

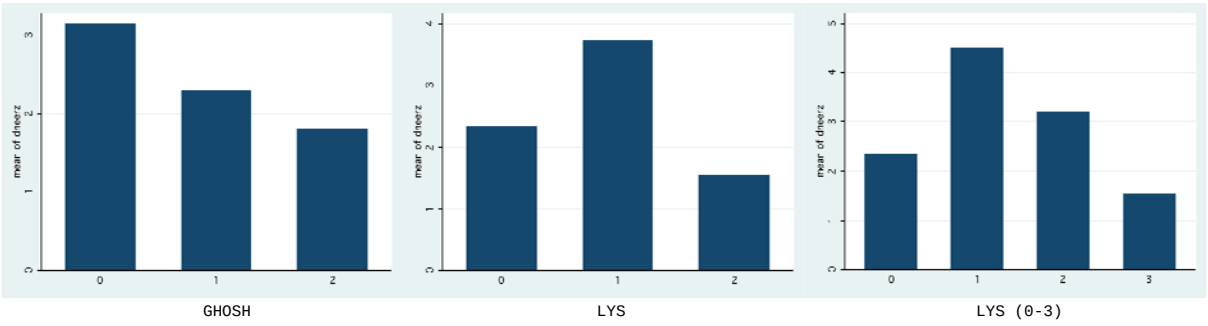
Figure 3: Median z-score according to LYS (range: 0-3)



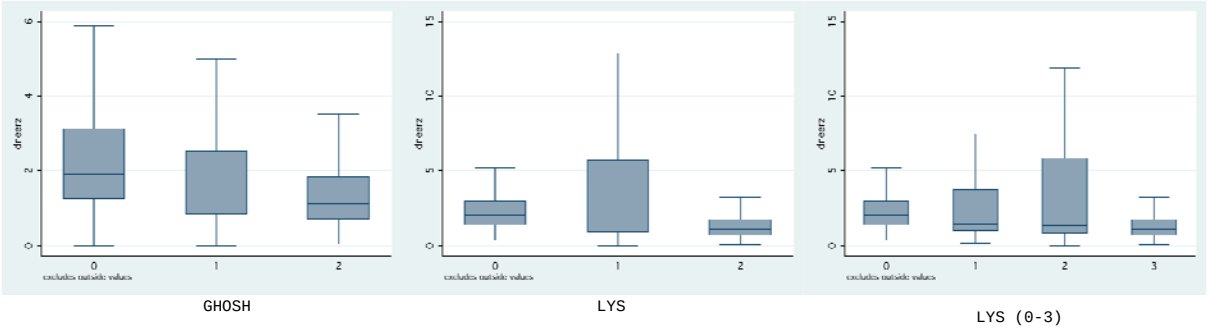
(where 3 is “Fixed”, 2 “Dirty Float/Crawling Peg”, 1 “Dirty Float”, and 0 “Floats”)

Figure 4: Mean z-scores according to regime

(Bar graphs)



(Boxplots)



C. <u>Properties of the error term under the Within Groups transformation</u>

Within Groups transformation:

$$CA_{it}^{*} = \rho_0^{*} + \rho_1 CA_{it-1}^{*} + \beta_1 \mathrm{Re}gime_{it}^{*} + \beta_2 (CA_{it-1} * \mathrm{Re}gime_{it})^{*} [+\beta_n Controls_{it}^{*}] + \varepsilon_{it}^{*}$$

where: $\varepsilon_{it}^{*} \equiv (\varepsilon_{it} - \bar{\varepsilon}_i)$ and $\bar{\varepsilon}_i = \frac{1}{T}\sum_{i,t=1}^{T} \varepsilon_{it}$; likewise for CA_{it}^{*}, CA_{it-1}^{*} etc.

Variance of the error term ε_{it}^{*}:

$$\begin{aligned} E[\varepsilon_{it}^{*2}] &= E[(\varepsilon_{it} - \bar{\varepsilon}_i)^2] \\ &= E[\varepsilon_{it}^2] + E[\bar{\varepsilon}_i^2] - 2E[\varepsilon_{it}\bar{\varepsilon}_i] \\ &= \sigma_\varepsilon^2 + \frac{1}{T}\sigma_\varepsilon^2 - 2\frac{1}{T}\sigma_\varepsilon^2 \\ &= \sigma_\varepsilon^2 - \frac{1}{T}\sigma_\varepsilon^2 \\ &= \sigma_\varepsilon^2(1 - \frac{1}{T}) \end{aligned}$$

Covariance of the error term ε_{it}^{*}:

$$\begin{aligned} E[\varepsilon_{it}^{*}\varepsilon_{is}^{*}] &= E[(\varepsilon_{it} - \bar{\varepsilon}_i)^2(\varepsilon_{is} - \bar{\varepsilon}_i)^2] \\ &= E[\varepsilon_{it}\varepsilon_{is}] - E[\varepsilon_{it}\bar{\varepsilon}_i] - E[\varepsilon_{is}\bar{\varepsilon}_i] + E[\bar{\varepsilon}_i^2] \\ &= 0 - \frac{1}{T}\sigma_\varepsilon^2 - \frac{1}{T}\sigma_\varepsilon^2 + \frac{1}{T}\sigma_\varepsilon^2 \\ &= -\frac{\sigma_\varepsilon^2}{T} < 0 \end{aligned}$$

Thus, the error terms are negatively correlated after the transformation. Interestingly, this holds true even if the disturbances were *uncorrelated* before. The **correlation coefficient** between ε_{it}^{*} and ε_{it-1}^{*} amounts to:

$$Corr(\varepsilon_{it}^{*}\varepsilon_{is}^{*}) = \frac{Cov(\varepsilon_{it}^{*}\varepsilon_{is}^{*})}{\sqrt{Var(\varepsilon_{it}^{*}) + Var(\varepsilon_{is}^{*})}} = \frac{-\frac{\sigma_\varepsilon^2}{T}}{\sigma_\varepsilon^2(1 - \frac{1}{T})}$$

$$= \frac{-\frac{\sigma_\varepsilon^2}{T}}{\sigma_\varepsilon^2(1 - \frac{1}{T})}\frac{T}{T}$$

$$= \frac{-\sigma_\varepsilon^2}{\sigma_\varepsilon^2(T-1)}$$

$$= -\frac{1}{T-1}$$

We see that the serial correlation decreases with increasing *T*. Simulations by Judson and Owen (1999) show, however, a bias equal to 20% of the coefficient of interest even when *T*=30.

D. List of Variables

Variables mentioned in the text are capital.

CI	Chinn and Ito (2008), http://web.pdx.edu/~ito/kaopen_2007.xls
GH	Ghosh, Gulde and Wolf (2003), their data can be found on a CD enclosed in the book
IFS	International Financial Statistics Database (IMF)
LYS	Levy-Yeyati and Sturzenegger (2003), http://profesores.utdt.edu/~ely/Base_2005.zip
WDI	World Development Indicators (World Bank)
WEO	World Economic Outlook (IMF)

Variable	**Definition**	**Unit**	**Source**
CA/GDP	Current account as percent of GDP	Percent per year (decimal fraction)	WDI
Exports/GDP	Export volumes as percent of GDP	Percent per year (decimal fraction)	WDI
FINANCE	Chinn/Ito index KAOPEN of financial liberalization	See Chinn and Ito (2008) for details*	CI
GHOSH	De jure classification of exchange rate regimes	Polychotomously ordered dummy variable (range: 0-2)	GH
High-Inc.	High income country, value 1 if country is a high income country, 0 otherwise	Binary Dummy Variable	WDI
Imports/GDP	Import volumes as percent of GDP	Percent per year (decimal fraction)	WDI
Ind.	Industrial country, value 1 if country is an industrial country, 0 otherwise	Binary Dummy Variable	WEO
INFLATION	Inflation rate	Consumer prices, annual	WDI
μ_{it}	Nominal Effective Exchange Rate, average monthly growth	Percent per month (decimal fraction)	IFS
σ_{it}	Nominal Effective Exchange Rate, standard deviation of monthly growth	Percent per month (decimal fraction)	IFS
Low-Inc.	Low income country, value 1 if country is a low income country, 0 otherwise	Binary Dummy Variable	WDI

LYS	De facto classification of exchange rate regimes	Polychotomously ordered dummy variable (range: 0-2)	LYS
Medium-Inc.	Medium income country, value 1 if country is a medium income country, 0 otherwise	Binary Dummy Variable	WDI
Non-Ind.	Non-industrial country, value 1 if country is not an industrial country, 0 otherwise	Binary Dummy Variable	WEO
Oil-Exp.	Oil-exporting country, value 1 if country is an oil-exporting country, 0 otherwise	Binary Dummy Variable	WEO
REGIME (z_{it})	Nominal Effective Exchange Rate, sum of absolute average and standard deviation of monthly growth	Percent per month (decimal fraction)	IFS
TRADE	Sum of exports and imports as percent of GDP	Percent per year (decimal fraction)	WDI

* *KAOPEN* is the first principal component of four indices, based on the binary dummy variables that codify the tabulation of restrictions on cross-border financial transactions reported in the IMF's Annual Report on Exchange Arrangements and Exchange Restrictions; in order to simplify interpretation, this variable is adjusted such that the minimum value is zero, i.e., *KAOPEN* ranges between zero and some positive value.

E. List of Countries

Afghanistan, I.R. of
Albania
Algeria
Antigua and Barbuda
Argentina
Armenia
Australia
Austria
Azerbaijan, Rep. of
Bahamas, The
Bahrain, Kingdom of
Bangladesh
Barbados
Belarus
Belgium
Belize
Benin
Bolivia
Bosnia & Herzegovina
Botswana
Brazil
Bulgaria
Burkina Faso
Burundi
Cameroon
Canada
Cape Verde
Central African Rep.
Chad
Chile
China
China, Hong Kong
Colombia
Comoros
Congo, Democratic Republic of
Congo, Republic of
Costa Rica
Côte d'Ivoire
Croatia
Cyprus
Czech Republic
Denmark
Djibouti
Dominica
Dominican Republic
Ecuador
Egypt
El Salvador
Equatorial Guinea
Estonia
Ethiopia
Fiji
Finland
France
Gabon
Gambia, The
Georgia
Germany
Ghana
Greece
Grenada
Guatemala
Guinea
Guinea-Bissau
Guyana
Haiti
Honduras
Hungary
Iceland
India
Indonesia
Iran, I.R. of
Iraq
Ireland
Israel
Italy
Jamaica
Japan
Jordan
Kazakhstan
Kenya
Korea, Rep.
Kuwait
Kyrgyz Republic
Lao People's Dem.Rep
Latvia
Lebanon
Lesotho
Liberia
Libya
Lithuania
Luxembourg
Macedonia, FYR
Madagascar
Malawi
Malaysia
Maldives
Mali

Malta
Mauritania
Mauritius
Mexico
Moldova
Morocco
Mozambique
Myanmar
Nepal
Netherlands
Netherlands Antilles
New Zealand
Nicaragua
Niger
Nigeria
Norway
Oman
Pakistan
Panama
Papua New Guinea
Paraguay
Peru
Philippines
Poland
Portugal
Qatar
Romania
Russia
Rwanda
Samoa
São Tomé & Príncipe
Saudi Arabia
Senegal
Seychelles
Sierra Leone
Singapore
Slovak Republic
Slovenia
Solomon Islands
Somalia
South Africa
Spain
Sri Lanka
St. Kitts and Nevis
St. Lucia
St. Vincent & Grens.
Sudan
Suriname
Swaziland
Sweden
Switzerland
Syrian Arab Republic
Tajikistan
Tanzania
Thailand
Togo
Tonga
Trinidad and Tobago
Tunisia
Turkey
Turkmenistan
Uganda
Ukraine
United Arab Emirates
United Kingdom
United States
Uruguay
Uzbekistan
Vanuatu
Venezuela, Rep. Bol.
Vietnam
Zambia
Zimbabwe